

Remarks

Favorable consideration of the instant claims is respectfully requested in view of the foregoing amendments and the following remarks:

*The Programmed Electronic Data Processing
Means Comprises the Apparatus of the Invention*

All claims expressly define the power generation apparatus of the invention to include electronic data processing means programmed for monitoring the formation of at least one gas phase product, and for controlling the cyclically effected steps recited based thereupon. It is essential to recognize that electronic data processing means, programmed to effect specific functions, is an *apparatus* limitation of the claims, to which full weight must be accorded, *inclusive of the particular functions* by which the programmed electronic data processing means is characterized. It is respectfully submitted that the Examiner's failure to do so in the present case constitutes a fundamental error of law, and was an essential factor leading to an incorrect conclusion as to the patentability of Applicants' invention.

More particularly, in finally rejecting each claim of the application the Examiner observes that "... neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim," and that "... process limitations do not have patentable weight in an apparatus claim." Irrespective of the correctness of those statements, they are inapposite to the invention presently claimed.

Applicants do not merely recite a manner of operating disclosed apparatus, nor do they merely recite a material or article worked upon. Rather, the claims of the application recite electronic data processing means that is expressly programmed to effect specified functions. Those programmed specified functions reside in and alter the memory of the electronic data processing means, and constitute a *physical* feature thereof. The electronic data processing means, so programmed, must therefore be accorded full weight in assessing the patentability of the claimed apparatus.

In discussing the issue at section 2106, the MPEP cites *In re Lowry*, 32 F.3d 1579, 153-84, 32USPQ2d 1031, 1035 (Fed. Cir. 1994). The court in *Lowry* held: “If a machine is programmed in a certain new and nonobvious way, it is *physically different* from a machine without that program.” (emphasis added) Clearly, the programmed electronic data processing means here claimed imparts physical features to the power generation apparatus, and constitute a fundamental component thereof. Those functions of the programmed electronic data processing means cannot properly be dismissed as constituting a mere “manner of operating a disclosed device nor material or article worked upon,” as the Examiner has done. To the contrary, they contribute fundamentally to the novelty and nonobviousness of the instant invention.

Other Errors in the Prior Rejections

Turning now to the substantive issues that were previously addressed, in maintaining her rejection of Claims 10 and 12-16 the Examiner contends that the Chittick patent satisfies the requirement for a catalyst in the second stage chamber.

As already pointed out, however, the char present in the Chittick reactor is expressly and necessarily consumed, and hence would not be deemed a catalyst by those skilled in the art. Nevertheless, and to avoid further controversy on the point, Applicants have now amended Claim 10 to expressly define the catalyst as being non-consumable, thus unequivocally distinguishing it from any char that may be produced during the procedure described by Chittick. The non-consumability of the catalyst is indicated by the potential for its regeneration, discussed at lines 19-21 on page 3 of the specification.

Moreover, it is noted that Claims 17 and 18 further define the catalyst to be a silica gel-based substance. Utilization of a silica gel-base catalyst (as compared, for example, to a ceramic catalyst) is unique and advantageous in the present process as functioning to crack the pyrolytic liquor without forming carbon; or if, due to prevailing reaction conditions, carbon is formed the silica gel-based catalyst is highly effective in promoting reactions with the oxidizing species introduced into the second chamber. Contrary to the Examiner's contentions, the combination of Chittick, Moriarty et al. and Aldridge or Bayer do not fairly teach, to one of ordinary skill in the art, the use of a silica gel-based catalyst wherein the silica gel material imparts catalytic activity, as does a reasonable reading of Applicant's disclosure (especially in the paragraph at the top of page 16).

As to the use of electronic data processing means in the claimed apparatus (i.e., even apart from particular program features), the Examiner has acknowledged that Chittick does not suggest the use of electronic data processing means, but she has

asserted that it would have been obvious, to one of ordinary skill in the art, to modify Chittick by employing the data processing means taught by Moriarty et al. "... for the purpose of increasing system flexibility and improving operation efficiency by allowing production of products having desired unique composition." In the final rejection, the Examiner points out that Moriarty et al. was relied upon only to show that varying process conditions will affect product composition (which is, of course, self-evident), and that a system for controlling product composition will *inherently* include data processing means for controlling the steps of the process (which is certainly an overly broad and unsupportable statement).

Applicants continue to disagree that it would have been obvious to incorporate electronic data processing means into the apparatus of Chittick, and they submit that the Examiner's contention that it would be obvious to do so (or beneficial — or indeed feasible) is entirely conjectural. In any event, and as is fully discussed above, the prior art is entirely devoid of any teaching of or suggestion for utilizing the programmed electronic data processing means that is defined in the instant claims, and that characterizes the apparatus of Applicants' invention.

Chittick discloses only a continuous process, which is carried out with no ostensible concern for control and with no suggestion that any product should be analyzed to enable variation of any parameter. Indeed, there is no basis for concluding that any significant parameter of the Chittick process is susceptible of control. It is noted that Claims 19 and 20 recite the programming of the data processing means for controlling operating parameters from the first and second

stages of the apparatus, such as flow rates of gases and temperatures (see page 16, lines 7-11). It can be *speculated* that, if any changes were to be made in order to modify the products obtained, Chittick might analyze the properties of the *solid phase* exiting the reactor. But doing so would introduce complex control problems and would, in any event, hardly suggest the monitoring of the formation of one or more gas phase products to enable computer control of the steps carried out utilizing the instant apparatus.

The fact that Moriarty et al. may teach that variant process conditions will affect product composition is virtually irrelevant, since such general information constitutes nothing more than fundamental knowledge possessed by the person of ordinary skill in the art. If the reference were to bear upon Applicants' invention, and if it were even arguably to be legitimately utilized in combination with Chittick, Moriarty et al. would have to teach the use of computer control of steps that are the same as or equivalent to those for which Applicants' apparatus is constructed, based upon gas monitoring, and it would have to do so moreover in a system that is sufficiently similar to that of Chittick to be logically (or indeed, reasonably) employed therewith. None of those conditions apply, and consequently the combination of references is wholly inadequate to provide a disclosure of or suggestion for the claim limitations here in question.

It is essential to note furthermore that Moriarty et al. does not teach anything about the use of *feedback* control of a process in which process measurements are used to change process conditions in real time. The reference also does not teach

anything about intelligent process control, which can be accomplished using artificial neural networks in which a control system can learn, and improve itself.

Moriarty et al. teaches only that, by changes in temperature, auger speed and flow rate, "the composition of the char or charcoal and other products may be varied." The focus of the patent is clearly on the properties of the char, with the gases being treated merely as by-products. In contrast, gases are the primary products of the instant method; carbon-rich char is a by-product.

In the Aldridge process, the catalyst is mixed with the feedstock in the first stage. In the instant process, on the other hand, there is no admixture of catalyst with feedstock and, indeed, the catalyst is expressly present in the second stage chamber.

Bayer describes suitable conversion catalysts in the paragraph beginning at line 7 in column 2. While the use of silica gel is disclosed, no equivalency is (or can properly be) drawn with the carbonaceous material of Chittick. Moreover, as in the Aldridge process Bayer mixes the catalyst with the feedstock in the primary pyrolysis step, in which the temperature does not exceed 600°C. Again, in the present method the catalyst is used in a step carried out in the second stage and at high temperatures (900° to 1100°C) for cracking of the pyrolysis liquid into gases; i.e., the application of the catalyst is completely different.


The Examiner rejected original Claims 14-16 as having been obvious, to one of ordinary skill in the art, over Chittick in view of Moriarty et al., taken further in view of admitted prior art. The errors entailed in utilizing Moriarty to supplement Chittick, in respect of the computer control component recited in Applicants' claims, have been

discussed above. Albeit Applicants do of course disclose the prior utilization of artificial neural network models, that disclosure certainly does not cure any of the very substantial deficiencies of the substantive rejections expressed by the Examiner, and this is particularly so in light of the inapplicability of such a model to the apparatus of the cited art, as discussed above.

In view of the foregoing, it is respectfully submitted that all claims of the instant application aptly define an apparatus that is novel and patentable over the prior art. Passage of the application to allowance is believed to be clearly in order, and is earnestly solicited.

Accompanying this RCE and Submission is a Petition for Extension of Time, together with payment of the requisite fee.

Respectfully submitted,
MICHAEL A. SERIO, ET AL.


By: _____
Ira S. Dorman
Attorney for Applicants
Reg. No. 24,469
Tel.: (860) 528-0772

CERTIFICATE OF MAILING

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